

REMARKS

Claims 1-20 were pending in this application. With this amendment, the applicants are amending claims 1, 4, 5, 10, 14, and 19. Claims 2, 3, and 20 have been canceled. Claim 21 has been added. Upon entry of this amendment, claims 1, 4-19, and 21 are the pending claims in this application.

In the Office Action dated May 20, 2003, claims 1, 2, 6-10, 12, 13, 17, and 18 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Stonehart et al. (US 5, 523,181). Claims 14, 15, 16, and 19 were rejected under 35 U.S.C. § 102 (e) as being anticipated by Denton et al. (US 6,042,958). Claims 3-5 and 11 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Stonehart '181 in view of Denton '958. Claim 20 was rejected under 35 U.S.C. § 103 (a) as unpatentable over Denton '958 in view of Stonehart '181.

In response to these rejections, independent claims 1, 10, and 14 have been amended to further distinguish the claims from the cited reference. Claims 1, 10, and 14 have been amended to include the limitation **"a mixture of micro-fine amorphous silica fibres and one or more chopped strand(s) of amorphous silica"**. The independent claims have also been amended to replace the phrase "that are bound with a binder" with the phrase "and the fibres are bound with the binder" for clarification. Support for these amendments can be found, for example, on page 3, line 25, and page 4, lines 4-5 of the specification. Therefore, the independent claims now include limitations of canceled claim 20 which only stands rejected under Section 103(a) as unpatentable over Denton '958 in view of Stonehart '181. Because claim 20 was not rejected as anticipated under either Stonehart '181 or Denton '958, the rejections under Section 102 have been rendered moot. For example, the Examiner recognized that Stonehart '181 does not disclose the nature of silica particles and silica fibres as a mixture of micro-fine amorphous silica fibres and one or more chopped strand(s) of amorphous silica. That Stonehart '181 does not disclose a mixture of micro-fine amorphous silica fibres and one or more chopped strand(s) of amorphous silica is confirmed by the Examiner's statement that Stonehart '181 does not disclose "the nature of silica fibres as chopped and/or microfibers." See page 4 of the Office Action.

Further, Denton '958, does not disclose a mixture of micro-fine amorphous silica and chopped silica fibres. Accordingly, because neither of the references used in the obviousness rejection disclose "a mixture of micro-fine amorphous silica fibres and one or more chopped strand(s) of amorphous silica," the third prong of a *prima facie* case of obviousness has not been established. In particular, the references fail to teach all of the claim limitations. See MPEP § 2143. Accordingly, the applicants respectfully request an indication of allowance of this application. The applicants contend that consideration of amended claim 1 is suitable even though a final Office Action has been made because most of the limitations of amended claim 1 were already existing in this application with the earlier presentation of claim 20.

Turning to the rejection of claim 20, the Examiner confirms that Denton '958 does not teach this limitation and stated in the Office Action that, "Denton teaches micro-fine glass fibers and chopped glass fibers in the examples, but does not specifically teach micro-fine and chopped silica fibers." See page 5 of the Office Action. The Office Action then states that Stonehart teaches the use of silica fibres for the substrate and membrane for ion conducting membranes. Then, the Office Action concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to "use the teaching of Stonehart and the teaching of Denton to have micro-fine fibres and chopped fibres for three-dimensional stability as taught by Denton and of silica for stabilizing conductivity as taught by Stonehart." See page 5 of the Office Action. The applicants traverse this rejection for the reasons set forth below.

Stonehart '181 discloses that silica particles and fibres are incorporated for their water retaining abilities. See column 3, lines 66-67 and column 4, lines 1-4. The invention disclosed by Stonehart '181 is directed to providing a polymer solid-electrolyte composition "having increased water content and an improved ion conductivity as well as decreased specific resistance." See Column 3, lines 14-19. Further, Stonehart '181 discloses that "fine particles of silica having large specific surface area seem to provide a high moisture absorption" which suggests that the "polymer solid-electrolyte composition containing silica and/or silica fibre may have a lower specific resistance and improved ion conductivity due to increase water content."

See column 3 line 66 through column 4, line 4. As such, the silica disclosed in Stonehart '181 "is preferably a high pure silica in an amorphous crystalline structure which has a fine particle size and a high specific surface area." See column 4, lines 15-17.

The applicants submit that one of ordinary skill in the art would not be motivated to adapt the invention of Stonehart '181 by combining it with Denton '958 in order to achieve the present invention. As noted above, the applicants have amended the independent claims to include the limitation "and the fibres are bound with a binder." The applicants assert that it would not have been obvious for one of ordinary skill in the art that silica fibres would provide improved conductivity when in the form of a sheet of fibres, bound with a binder. One of skill in the art would recognize that the water retentive quality of the silica fibres could be adversely affected when the fibers are bound together, particularly as binding the fibres would affect the fibres' surface area. Therefore, one of ordinary skill in the art would not be motivated to modify the invention in the manner suggested by the Examiner, and also, to have the silica fibres bound with a binder, as claimed in the amended independent claims 1 and 10. Therefore, the second prong of MPEP § 2143, namely, that there must be a reasonable expectation of success, is also not met. Consequently, the applicants respectfully request allowance of the pending claims for this reason also.

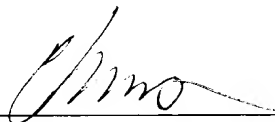
Further, the applicants submit that one of ordinary skill in the art would not be motivated to modify the invention as set forth in Denton '958 in the manner suggested by the Examiner, namely to use micro-fine fibres and chopped fibres for three-dimensional stability as taught by Denton and to use silica for stabilizing conductivity as taught by Stonehart. As noted above, Denton '958, teaches micro-fine glass fibers and chopped glass fibers in the examples, and not specifically, micro-fine and chopped silica fibers. Additionally, example 7 of Denton '958, discloses that "the composite membranes of this invention have a comparable specific resistance to the pure Nafion[®] family of membranes." See column 9, lines 25-42. Because the membranes disclosed in Denton '958 already had specific resistance comparable to state of the art membranes, there would be no motivation to change the type of fibre at all, let alone to micro-fine and chopped silica fibres as in the claimed invention, in order to provide improved ion conductivity. Thus, the applicants assert that one of ordinary skill in the art would not have

been motivated to combine the cited references in the manner suggested by the Examiner for obtaining three-dimensional stability. Also, as stated above, it would not have been obvious to one of ordinary skill in the art that the silica fibres would provide improved conductivity when used in the form of a sheet of fibres, bound with a binder, when the surface area of the fibres is reduced due to the binder.

CONCLUSION

For the aforementioned reasons, the applicants submit that the pending claims are in condition for allowance. All grounds for rejection have been overcome by the present amendment. Additionally, newly added claim 21 has full support in the specification and no new matter has been added. For all of these reasons, the applicants respectfully submit that the rejections under 35 U.S.C. §§ 102 and 103 should be withdrawn and favorable action is earnestly solicited.

Respectfully submitted,



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